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ORGANIZATION AND MINING ACTIVITIES OF DAL'STROY

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In August 1932, the Soviet government, by a special ukase, directed the Collegium of the NKVD to organize prospecting and production of gold in the Kolyma River basin in the far northeastern part of the USSR. In compliance with the government ukase, the NKVD organized the State Trust of Construction of the Far North (Dal'stroy or DS, NKVD). In 1938, it was renamed the Main Administration of Construction of the Far North (glavnoye upravleniye stroitel'stva dal'nego severa). The labor for this purpose was to be supplied by the Main Administration for Labor Camps NKVD (GULAG, NKVD); in other words, corrective labor camps were to be established in the Kolyma area.

The ukase had two objectives: (1) to exploit the rich mineral resources of the territory, using cheap forced labor and (2) to establish a number of new concentration camps, inmates of which would be completely isolated from the rest of the population, with little chance for escape because of the remoteness of the camps.

As a result of the expeditions of Boriskin, a noted gold prospector, it was well known as far back as before World War I that there were rich gold deposits along the tributaries of the Kolyma River, especially along the lower stretch of the Srednikan, a right tributary of the Kolyma. The remote territory and its riches were forgotten during the war and revolution, but in 1928 two organizations, Glavzoloto (Main Administration of Gold Mining) and the TsNIGRI (Central Scientific-Research Geological Prospecting Institute), simultaneously sent prospecting expeditions to the Far North. As no geologists were included among the prospectors of Glavzoloto, the results of this expedition were negligible. The TsNIGRI expedition was, however, organized much better, since it had among its members well-educated specialists like geologists, geodesists, and topographers. The expedition was headed by Bilibin, a mining engineer and geologist, who was assisted by Tsaregradskiy, a geologist-panteologist. The prospecting group was headed by Vosnesenskiy, a geologist.

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This expedition was to make geological and topographical surveys of the Kolyma basin on a 1:1,000,000 scale, and to search for useful minerals, especially gold. The expedition was given 5 years to complete the field work and another year for making a final report, which was to be submitted by the end of 1934 or early in 1935. However, enough material was accumulated by 1932 to prove the existence of rich gold deposits in the Kolyma basin and the expeditions submitted its preliminary report. At about the same time, Tsaregradskiy and his group, who had been prospecting for coal near Verkhne-Kolymsk, a small village, reported that they found coal deposits which could be profitably exploited.

The August 1932 ukase was based on the findings of these preliminary reports. In addition to the proposed mining activities in the Kolyma area, the ukase also decreed the beginning of road building and civilian and industrial construction. Besides its importance for the new mining industry, the building of roads in the Kolyma area was also important from a strategic viewpoint, as the highway would connect the shores of the Nogayevo Bay in the Sea of Okhotsk with the Transsiberian railroad at Irkutsk, via Yakutsk.

Administrative Structure of Dal'stroy

The administration of Dal'stroy is broken down as follows:

1. Main Administration of Dal'stroy; located in Magadan.
2. Administration of Road Construction; located in Magadan.
3. Administration of Automobile Transport; located in Magadan.
4. Administration of Municipal and Civilian Construction; located in Magadan.
5. Administration of Water Transport and Ports; located in Magadan.
6. Southern Mining Administration (YuGPU); located in Opotukan village, 400 kilometers from Magadan; carries on mining and prospecting of gold.
7. Northern Mining Administration (SGPU), located in Khatynsk village, 600 kilometers from Magadan; carries on mining and prospecting of gold.
8. Northwestern Mining Administration (SZGPU); located near the tin mines on the Seymchan River 700 kilometers from Magadan; carries on prospecting and mining of tin.
9. Western Mining Administration (ZGPU); located in a small village on the upper Kolyma River, 800-900 kilometers from Magadan; was established in 1939; carries on gold mining.
10. Geological Prospecting Administration; located in Magadan; organizes expeditions into remote districts; carries on geological surveys and prospecting for useful minerals.
11. Agricultural Administration; located in the village of Seymchan; supervises two sovkhoses: (a) the Tauyskiy Sovkhoz, located on the Tauy River; has fisheries, pig-raising farm, dairy; carries on truck gardening. (b) The Seymchanskiy Sovkhoz, located on the Seymchan River; has a pig-raising farm, dairy; carries on truck gardening.
12. Supply Administration; located in Magadan; is responsible for planning and procuring technical equipment for Dal'stroy enterprises and the labor camps; procures food and clothing for the convicts; organizes storage and transportation.

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13. Moscow Office of Dal'stroy; was established for purpose of hiring needed technical personnel; procures and purchases equipment and food for the Supply Administration of Dal'stroy.

14. Vladivostok Office of Dal'stroy; transshipment base and storage of technical equipment and food.

In the past, one of the members of the Collegium of NKVD was usually appointed as head of Dal'stroy. He was responsible only to the Collegium. He was given unlimited rights and was the ruler of the region. The prosecutor, the court, the social and party organizations, and the labor unions were placed under his jurisdiction. Dal'stroy was a state within the state. In 1932, Eduard Berzin, of Latvian origin, became the head of Dal'stroy. At the time of his appointment he was the commandant of the Kremlin and a personal friend of Genrikh Yagoda, the People's Commissar of Internal Affairs. In 1938, Yezhov, the new People's Commissar of Internal Affairs, removed Berzin from his post and had him arrested for being an "enemy of the people." Berzin's successor in his turn was arrested also as an "enemy of the people" in 1939 by Beriia, who took over the NKVD from Yezhov.

The head of Dal'stroy has four assistants: deputy head, assistant for political affairs, assistant for camp operation, and assistant for personnel.

The deputy head is appointed by the Collegium of NKVD with the consent of the head of Dal'stroy and he represents the head during his absence. The assistant for political matters is "the eyes and ears" of the party. He sees to it that the party directives are faithfully carried out and directs other party work, such as propaganda, Stakhanovite movement, etc., within the region and jurisdiction of Dal'stroy. His rights are rather limited, since he is not allowed to take any measures without first consulting the head of Dal'stroy.

The assistant in charge of the labor camps is the head of the Dal'stroy labor camps (Dal'lag) and is appointed by GULAG, NKVD. Besides his general administrative duties, he controls the maintenance of the statistical records of the inmates and is in charge of their food and clothing. He also controls the utilization of forced labor and directs the education of the inmates.

The assistant for personnel, who is also the chief of the Special Department of Dal'stroy, is appointed by the Collegium of the NKVD from the NKVD staff. The duties of his office include investigating and screening applicants for jobs, hiring and discharging employees, and keeping records of all employees, including former employment.

Employees occupying responsible positions in various departmental administrations are usually appointed by the head of Dal'stroy or his assistants.

The heads of the production or economic administrations are appointed by the head of Dal'stroy. As a rule, the appointee has to be a member of the Communist Party or an employee of the NKVD. He may even be appointed from the inmates; in such a case, the appointee has to be a former party worker or a former NKVD man of high standing. For instance, in 1935 the post of the director of the Southern Mining Administration went to Medved', former head of the NKVD of Leningrad Oblast, who was arrested and banished to Siberia for 3 years because of carelessness after the assassination of Kirov. Zaposozhets, Medved's former deputy, was appointed head of the Administration of Load Construction. Since 1932, Rappaport, another convict, and former customs director in Leningrad and a member of the Leningrad Oblast Communist Party, has been head of the Supply Administration.

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On the other hand, Prof Anatoliy Kapitonovich Boldyrev, the world-renowned crystallographer, and one of the greatest specialists in the study of piezoelectric crystals and the structure of the atom, had to perform physical work, cutting timber at the age of 60. He was convicted for a pseudopolitical crime despite the fact that he had never participated in politics, being exclusively interested in scientific research. He was arrested in 1935 and banished for 15 years to Kolyma for belonging, during his college years, to the Constitutional Democratic Party of prerevolutionary Russia. Petitions and requests by a Dal'stroy geologist to have A. Boldyrev transferred to the research laboratory under the Geological Prospecting Administration were of no avail.

Of course, it was unconstitutional and against the laws to appoint a convicted former NKVD or party member to the top administrative posts in Dal'stroy, as it was clearly stated in the constitution that all the "temporarily isolated" have no right to participate in the country's political, social, or business activities. However, Dal'stroy has its own laws and constitution, established by the head of Dal'stroy.

Each chief of the administrations of Dal'stroy has three assistants: an assistant for political affairs, one for production (chief engineer), and another for camp operation.

The administration assistant for political affairs is appointed by the assistant for political affairs under the head of Dal'stroy. He is appointed from among the party workers allotted to Dal'stroy by the TsK VKP(b). Although these administration assistants for political affairs are often semi-illiterate persons, they are trusted Communists.

The administration assistant for production is appointed by the assistant for production under the head of Dal'stroy.

The administration assistant for camp operation is appointed by the assistant for camp operation under the head of Dal'stroy. He is appointed from among the NKVD men, including convicts.

The production chiefs (mines, road-building sections, motor pool, etc.) are appointed by the heads of the administrations after the final approval by the head or deputy head of Dal'stroy. The majority of the production chiefs are hired engineer specialists. They do not have to be party members.

The production chiefs have one or two assistants, depending on the amount of work assigned. One of these posts, also called the chief engineer is not always filled, whereas that known as the assistant of camp operation is always designated. This chief engineer, i.e., under the production chiefs, is appointed by the head of the personnel department of the Main Administration of Dal'stroy on request of the chief of the administration concerned and is taken from the hired staff. The production chief's assistant for camp operation is appointed by the departmental assistant for camp operation. In some cases, the appointment is made by the Main Administration of Dal'stroy. Usually he is a convict and former NKVD man, having served his time or still serving it.

Geographical Data; Transportation

The Kolyma territory includes the sections of the Sea of Okhotsk shore between the city of Okhotsk and the Gizhiga River and the Kolyma and Indigirka river basins. The area occupies approximately 7.2 million square kilometers. The terrain is mountainous with an abundance of waterways. The hills, which are comparatively low, form a well defined mountain range which is the continuation of the Stanovoy or Yablonovoy ranges and extends from the southwest to the northeast. Another branch range, the Kolymskiy Range, runs almost from south to north and

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is the watershed which divides the tributaries of the Kolyma and the rivers flowing into the Sea of Okhotsk. The general height of both ranges does not exceed 1,000-1,500 meters above sea level, but a few rise to 2,500-3,000 meters.

There are five large rivers in this region. The Indigirka and Kolyma are about 2,800-2,900 kilometers long each, are navigable, and flow in a northerly direction into the Arctic Sea. Among the many rivers discharging into the Sea of Okhotsk are the three larger ones: the Gizhiga, flowing southward into the Gizhiga Bay in the northern corner of the Sea of Okhotsk, and the Yan and Tauy rivers, which flow into Tauy Bay. The river valleys reach a width of 50-60 kilometers, and those of Kolyma and Indigirka in their lower stretches reach 150-200 kilometers. All the river valleys in the Kolyma region, including the Y-shaped valleys of the smaller streams, have the same peculiar structure of terraced valleys, sometimes called "suspended valleys." Dense forests of larch trees, which produce excellent lumber for construction, and the northern-type creeping cedars cover the valleys and slopes.

At present, the Kolyma region can be reached only by sea either from Vladivostok to Magadan or from Murmansk to the Ambarchik Bay (the mouth of the Kolyma River). The Vladivostok-Magadan route has its disadvantages because of the endless number of reefs in the Tatarskiy Strait and because of the prevailing storms and fog, which make navigation very hazardous. The port Magadan in the Nogayevo Bay was built in 1934 and takes its name from the city located nearby. The port has been assigned five steamers with a total capacity of 60,000 tons. The port and the steamers were under the jurisdiction of the NKVD. The Murmansk-Ambarchik sea lane in the Arctic Ocean is used for shipments of bulky mining equipment and other unperishable goods. From the Ambarchik Bay the goods are transferred onto barges, which are towed up the Kolyma River.

The construction of Magadan, which is the administrative center of the region, was begun in 1933 on the site of a little village inhabited by a local Yukashr tribe. A 700-kilometer-long highway connecting all the mining enterprises of this region with Magadan was completed in 1940. It was planned to extend the highway eventually as far as Yakutsk. A survey for the road's extension to the Indigirka River began in 1939 and was expected to continue through 1941. In 1940, the motor pool of Dal'stroy already had 2,500 motor vehicles in operation.

Available Minerals

Disregarding the expedition headed by Cherskiy in 1910, the expedition of 1928, headed by Bilibin, was the first well organized one, particularly from a scientific standpoint. Besides confirming the existence of rich gold deposits at certain points, it discovered a number of new regions with exceedingly rich gold deposits. While prior to Bilibin's expedition only one gold-bearing region, the Srednikanskiy (Srednikan is a right tributary of the Kolyma River) was known, Bilibin discovered gold deposits on the Orotukan and Winaza rivers (right tributaries of the Kolyma), on the Khatynakh, Partizan, and Seymchan rivers (left tributaries of the Kolyma), on a large number of the tributaries of the Seymchan River, on the upper Kolyma River, and on some tributaries of the Indigirka River. The Indigirka River itself was not investigated by Bilibin's expedition.

1. Placer-Gold Deposits

The gold-bearing regions nearest to Magadan are located 400 kilometers north of that city. Roads are completely lacking and the gold regions can be reached only in winter with dogs and reindeer.

In 1933, Dal'stroy received its first government assignment for gold production and was to obtain 800 kilograms of gold. This gold was to be produced only in the Srednikan gold-bearing region, and the Srednikan Mining Administration

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was formed for this purpose. Because of lack of labor, only 300 kilograms were produced. The Orotukan Mining Administration was organized in 1935, and was renamed the Southern Mining Administration in 1936, while, in addition, the Northern Mining Administration was formed. On 1 September 1936, the Srednikan Mining Administration was closed temporarily; from that date on, no gold was extracted from that region.

The following table gives the planned and actual production figures in the Kolyma area for the period from 1933 to 1940:

<u>Year</u>	<u>Administration</u>	<u>Planned Production (kg)</u>	<u>Actual Production (kg)</u>
1933	Srednikan	800	300
1934	Srednikan	800	1,200
1935	Orotukan	4,000	7,000
	Srednikan	<u>1,000</u>	<u>1,000</u>
	Total	5,000	8,000
1936	Southern	5,000	8,000
	Srednikan	1,000	300
	Northern	<u>2,000</u>	<u>4,000</u>
	Total	8,000	12,300
1937	Southern	10,000	10,000
	Northern	<u>5,000</u>	<u>10,000</u>
	Total	15,000	20,000
1938	Southern	10,000	10,000
	Northern	<u>20,000</u>	<u>20,000</u>
	Total	30,000	30,000
1939	Southern	15,000	15,000
	Northern	<u>30,000</u>	<u>35,000</u>
	Total	45,000	50,000
1940	Southern	15,000	15,000
	Northern	40,000	40,000
	Western	--	600
	Total	<u>55,000</u>	<u>55,600</u>
Total up to 1 Jan 1940		159,600	177,400

In 1941 the government assignments for all three administrations amounted to 60,000 kilograms; however, according to unofficial information available, this assignment was exceeded. Thus, during 9 years of operation, i.e., up to 1 January 1942, Dal'stroy gave the USSR treasury 237 tons of gold. With the opening of the Western Mining Administration, gold extraction should be not less than 75 tons of gold yearly for approximately 10 years. With the opening of the Indigirka area, gold extraction will maintain this level for approximately 15-20 years, while extraction in the Kolyma area will decrease.

Placer-gold reserves in the Kolyma area are estimated at 4,000-5,000 tons, with the ore having an average content of from 15 to 50 grams of gold per cubic meter, i.e., from 7 to 24 grams per ton.

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As of 1 January 1941, these reserves were distributed among the ore administrations as follows:

<u>Administration</u>	<u>Reserves (tons)</u>	<u>Average Gold Content per Cubic Meter (gr)</u>
Srednikan	25	8-15
Southern	400	8-20
Northern	800	15-60
Western	1,500	50
Indigirka	2,000	30-40

Some mines have an unbelievable average gold content. For instance, the Northern Mining Administration's Partizan mine, located on the Partizan River, has an average content of from 150 to 250 grams per cubic meter of ore. The valley of the river is gold bearing all the way across its width. On the average, the valley is about 150 meters wide. Naturally, on the edges the gold content is considerably less, but in general it is sufficiently high, 30-50 grams per cubic meter. This content stretches for almost 5 kilometers. The thickness of the gold-bearing sands is from 0.3 meter to 2 meters. In working this deposit, sections with a gold content of up to 30 grams per cubic meter were not processed, but piled in heaps to one side. Other mines of this type are the "Pyatiletka" mine of the Southern Mining Administration and several mines in the Western Mining Administration. Preliminary information indicates that the Indigirka region also has rather rich mines.

2. Gold-Lode Deposits

Since the Kolyma region is still so rich in placer-gold deposits, and since exploitation of these deposits requires a small amount of capital investment, it is natural that the development of lode deposits is going exceedingly slowly. The presence of placer gold of the Partizan type shows the indisputable presence of rich sources of these placers, i.e., lode deposits. As of 1 January 1941, only four lode formations were known in the Kolyma area: the Srednikan porphyritic gold-bearing dikes, Ustine porphyritic gold-bearing dike, a series of porphyritic dikes and quartz veins on the Khatynakh river, and a series of porphyritic dikes on the Partizan River. The first two deposits belong to the Southern Mining Administration and the second two to the Northern Mining Administration.

a. Srednikan Gold-Ore Porphyritic Dike

The Srednikan gold-ore porphyritic dike cuts across the Jurassic clayey shales in a northeast strike. The average thickness of the dike is 15-20 meters. This dike has been traced by mine workings for a distance of about 15 kilometers, from the mouth of Geologicheskij spring to the top of the Boriskin spring, at a depth of about 150-200 meters.

Four galleries were built for exploring the dike, along with deep bore pits in the valley of the Srednikan River, and trenches in the slopes of mounds. The extremely fine gold is distributed throughout the whole thickness of the dike, but does not form any significant concentrations or veins. The average gold content is from 2 to 5 grams per ton and the estimated reserves to a depth of 150 meters amount to 150 tons of gold. This deposit was considered as not having any industrial significance at the time.

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b. Gold-Ore Deposit of the Utina River

The porphyritic dikes of this deposit are gold bearing, just as on the Srednikan River. Although the dikes are much thinner and might be called porphyry veins, in structure they are identical to the Srednikan porphyritic dike.

Three such dikes (veins) have been discovered running parallel to each other, also in a northeast strike. The middle vein is more or less exposed both along the strike and across the width of the vein. The average thickness varies from 1 to 1½ meters. The other two, less exposed along the strike, have a beaded formation. They are impregnated with gold and the gold in them is distributed unevenly, with sections of greater and lesser concentration. Sectors are often encountered where the gold is concentrated in the form of lenses and veins 2-3 millimeters thick.

Seven galleries and two shafts were built for exploring the veins. The shafts were located in the water-collecting depression of the Utina River, one being sunk to a depth of 90 meters and the other to a depth of 130 meters (data as of 1 January 1941). Along the strike the veins were traced by means of trenches and bore holes for 2,500 meters. According to data of the tests, the gold content varies from 5 to 150 grams per ton of ore and the average gold content is 20 grams per ton. In calculating the reserves, both the sections with low and with increased average gold content were taken into account. It was planned to begin in 1941 the exploitation of sections with an average gold content of 50-80 grams per ton.

c. Porphyritic Dikes and Quartz Veins on the Khatynakh and Partizan Rivers

As on the Utina River, the gold-bearing porphyritic dikes of the Khatznakh and Partizan rivers are of small thickness and therefore can be regarded as porphyritic veins.

The porphyritic veins are absolutely identical to those of the Utina River in structure, formation, and character of mineralization. However, the gold content is higher than in the Utina veins. According to surface exploration (made in 1937 - 1938), there were frequent cases where tests yielded a gold content of up to 2,500 grams per ton of ore. However, the majority of tests showed a content of 50, 60, and 80 grams per ton of ore.

Gold-bearing quartz veins were discovered on the Khatynakh River. These veins are of comparatively small thickness (0.5 - 0.8 meter). The quartz is of a milky white color with a slightly dingy tinge. The quartz veins are of a beaded or lenticular character and were crushed by tectonic phenomena of an upthrust character. The gold in the quartz veins is concentrated in the form of a more or less large phenocryst, easily visible to the naked eye, or in the form of veinlets or streaks.

According to tests, the gold content varies, but most tests showed a content of 100 or more grams per ton. Barren tests amounted to about 20 percent. The gold-bearing quartz veins were uncovered by surface prospecting; therefore, no calculation of reserves was made. However, it is estimated that the veins of the Partizan River, extending to a depth of 200 meters and for 1,000 meters along the strike, could yield 50-60 tons of gold. The veins of the Khatynakh River, for the same dimensions, could yield 80-90 tons.

3. Cassiterite Deposit (Tin Ore)

In 1935, at the "Tayezhnyi" Mine, located on the Tayezhnaya River (right tributary of the Orotukan River), chief mine engineer Sergey Lapin (who at that time was a prisoner) discovered cassiterite in the schlich

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(heavy part of the ore which settles with the gold in washing). A more detailed study of the alluvium of the Tayezhnaya River showed that it was exceedingly rich in cassiterite pebbles and detritus. Additional screens were built into the washing drum, and, on the first day the modified drum operated, about 200 kilograms of pure cassiterite were obtained, chiefly in the form of large pebbles. The average cassiterite content of the gold deposit of the Tayezhnaya River was estimated at 2-2.5 kilograms per cubic meter.

Quartz-tourmaline veins of cassiterite were discovered at the very source of the Tayezhnaya River. The veins were 0.2-0.3 meter thick, with an average cassiterite content of up to 1.5 percent.

Three other deposits of cassiterite mineralization were discovered. These deposits were (1) at the source of the Verkhniy Orotukan River, (2) in the area below the middle course of the Seymchan River, and (3) at the upper El'gen River, on the divide between the Kolyma basin and the rivers flowing into the Sea of Okhotsk. The last two cassiterite deposits, which have been verified, have rather thick quartz veins with cassiterite veinlets from 0.05 to 0.3 meter thick running through them. Prospecting, begun in 1938, uncovered seven quartz-cassiterite veins and there are many more of them. In 1940, the deposit was supposed to yield 120 tons of pure cassiterite. According to mining engineer Drapkin, this deposit has cassiterite reserves of 800,000-900,000 tons, or about 650,000 tons of tin (the deposit measures 500 meters along the strike and is 300 meters deep).

Exploration of the Seymchan deposit was supposed to begin in 1940 and it was to be much richer than the deposit on the El'gen River. Among other things, it is a rich placer deposit. It was planned to extract 300 tons of cassiterite from the placer deposit in 1941.

According to investigations by Professor Sergey Smirnov, the El'gen and Seymchan deposits, the reserves of which have been verified, should be regarded as deposits of world-wide significance; therefore, they should be explored in the near future and put into operation. For this purpose, the Main Administration of Dal'stroy organized the Northwestern Mining Administration, having charge only of tin deposits.

4. Coal Deposits

Even before World War I an expedition discovered outcroppings of coal seams in the lower course of the Kolyma River, not far from the settlement of Verkhne-Kolymsk, on the right tributary of the Kolyma. In 1928, another expedition registered about ten outcroppings of coal. The coal was of good quality, containing 5,500-6,000 calories. The presence of three coal seams, with a total productive thickness of 15 meters, was established. In 1933, it was established that the seams increased in thickness, and that seam No 3 reached a thickness of 20 meters. The seams lie almost horizontally, with a very slight dip. Coal reserves of the deposit were estimated at up to 150 million tons.

Mining Methods

1. Prospecting

If, by taking samples, it has been established that the well or spring valley has gold deposits, sampling pits are dug at every 20 meters (sometimes 40 meters) along two lines crossing each other at a right angle. Consecutive holes are dug along the lines parallel to the original ones at a distance of 500 or 1,000 meters, depending on the approximate extent of the gold-bearing

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area determined by preliminary prospecting. This process is continued until the samples taken from the pits along the last two lines show negative results. The first step of prospecting is completed with mapping the borders of the deposits and estimating the reserves under category "C".

If the average gold content is considered to be large enough to justify exploitation, the next step is to carry out more thorough surveying. This consists of digging additional pits, thus decreasing the distances between two pit lines to 50 or 100 meters, and between two pits to 10 meters. The pits are dug 1.2 meters by 1.5 meters, with their wider side parallel to the length of the valley. The basic and most important part of this work is the correct cutting of the pits and sampling. The pits are divided into individual workings, each 20 centimeters deep, measured from the surface of the ground. The top workings, consisting of vegetative and black-soil layers, are not sampled and are discarded. If, for example, the top layer of the vegetative and black soil is 30 centimeters thick, i.e., one and a half workings, after its dumping, the remaining part of the second working (10 centimeters deep) is separated in small piles and tagged with the number of the line, pit, and working. Therefore, if the shaft is 1.6 meters deep, there will be eight workings, but only seven of them will be laid out and tested.

A special skill is required to separate the workings in the Kolyma region because of the muddy and frozen ground. The pits can be effectively worked and sampled only in winter. In summer, the work involves additional expenses for pumping out water and for mine supports, and even then there is always a danger of the gold sinking to the bottom of the pit, thus rendering the sampling of the workings inaccurate. For this reason, working of the pits in the river bed during the summer is quite impossible.

On the other hand, winter mining necessitates the thawing of the ground. This is done by making a fire inside the pit. When the pits are worked in a river bed, or quicksand is encountered, the thawing is done by placing heated rocks on the bottom of the pit.

Sampling begins after the workings of several lines of pits have been exposed. Two yendovas (wooden box with a content of 0.025 cubic meter) of the rock are taken from each working and the gold is panned out, using hot water. If the gold content of the sample is high enough, the entire working is panned out. The material obtained is packed and marked to indicate the line number, pit number, working number, and the number of the yendova panned. The samples are then sent to the geological prospecting bureau where the impurities are separated from the gold, after which the gold is weighed. This data serves as a basis for calculating the average contents of gold in every pit. All the data is entered on the surveyors' topographical plan, and the surveyed area is turned over to the exploitation branch of the enterprise.

2. Exploitation

The exploitation of an alluvial deposit consists of preliminary works and jigging. The preliminary works consist of stripping open the deposit layer, providing ditches for draining water from the cuts, diverting rivers if necessary, providing water supply for the jigging machine, and installation of equipment for panning. Of the above operations, the stripping of the deposit of the barren rock and the top soil is the most expensive, requiring much labor. In view of the short summer and permanently frozen ground in Kolyma, this work must be carried out during the winter to allow the gold-bearing sands to thaw as soon as the warm weather sets in.

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The stripping is usually carried out by means of blasting. The blast holes are drilled by means of hollow typ bores. The bores are hammered into the ground by hand. Steam is supplied into the bores from portable boilers installed on slides to help boring the frozen ground. Special spoons are used for removing the thawed material from the bore. The material is then tested for its gold content. This method requires from 1.5 to 2 hours to bore a hole 15-20 centimeters in diameter and 2.0-2.5 meters deep. Usually one man operates four or five bores simultaneously. Consequently, one man during a 10-hour shift bores approximately 60-70 linear meters. After it has been established by testing that the drilled material does not contain gold, the blasting takes place. The blasted waste rock is carried away to the dumping grounds on sledges, either by hand or by means of the "mechanical ice lane." The latter works on an iced-surface lane and a moving steel rope to which sledges (each loaded with about 0.2-0.3 cubic meters of the waste rock) are attached.

It is a rule to leave a 10-20 centimeter thick "jacket" of "nonbearing" material on the top while stripping a gold deposit.

Experimental panning begins toward the end of May, at which time comparatively warm weather sets in. However, the real production season begins in June and ends during the first half of September, when the temperature drops to the freezing point and it starts to snow. Gold is washed on double trough type buddles, 20-25 meters long. The tailings are not carried away but are washed down by water. As the final step, the washed gold is separated from impurities.

Conclusion

The Kolymo-Indigirka region is really rich in minerals, but so far it has been surveyed rather superficially. A more systematic geological survey would reveal the presence of richer deposits. The gold fever affected the members of Bilibin's expedition to such an extent that they overlooked the fact that there are other minerals which sometimes are as important as gold. For instance, they failed to detect the tin-ore deposits which were discovered due to the initiative of the chief engineer of the "Tagezhnyy" mine.

A further exploitation of the coal deposits would enable at least a partial processing of some of the ores on the spot. The Yablonovyy Range morphologically connects the Kolymo-Indigirka area with the Transbaykal territory and the geological similarity of these two regions may suggest the presence of tungsten, molybdenum, and other metals in the Kolymo-Indigirka basin. Incidentally, a small deposit of stibnite was found in 1934 on the Krokhalinyy River (a right tributary of the Kolyva) about 15 kilometers above its confluence with the Srednikan River.

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